MCRSync-NTP
User Manual

Masterclock®

CE FC

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Disclaimer

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Trademarks

Trademarks mentioned in this manual are the property of their respective owners.

Icons Used In This Manual

Caution: This icon signifies a potential hazard, and gives tips on how to avoid them.

Important Information: This icon indicates to an important step that must be followed.

Technical Note: This icon describes technical terms and actions.

Helpful Hint: This icon suggests the general setup and practice.

Printing

While optimized for onscreen viewing, the pages of this manual are formatted for printing on 8 1/2” x 11” and A4 sized paper, giving you the option to print the entire manual or just a specific page or section.

Introduction

The MCRSync-NTP server (Master Clock Reference - Network Time Protocol) is an NTP version 3 compliant mode-4 server for use with Masterclock's newer generation of PC cards, which includes the TCR1000 time code reader card and the PCIe card (TCR, GPS, HSO and OSC models). It is specifically designed for networks where local and uninterrupted timing information is necessary or networks with limited Internet connectivity. Using NTP, (Network Time Protocol), accurate timing information can be distributed over many types of platforms using many available or proprietary NTP clients and secondary servers.

Modes of Operation

The MCRSync-NTP server was specifically designed to operate as a primary (NTP stratum 1) reference server. The server is directly coupled with the TCR1000 card installed.

The MCRSync-NTP server will not operate in a peer to peer mode. It is not designed to synchronize to any other reference server. This does not mean that the MCRSync-NTP server is not scalable, if other servers use the MCRSync-NTP server as their primary reference server, a timing network can be established that can service the timing needs of thousands of platforms with accurate time.
The MCRSync-NTP server has two modes of operation. The first mode of operation sets up the MCRSync-NTP server as the only NTP server on the network. Each NTP client then sends a time request to the MCRSync-NTP server for its timing information. This approach is satisfactory for small to mid-size networks as shown in Figure 1.

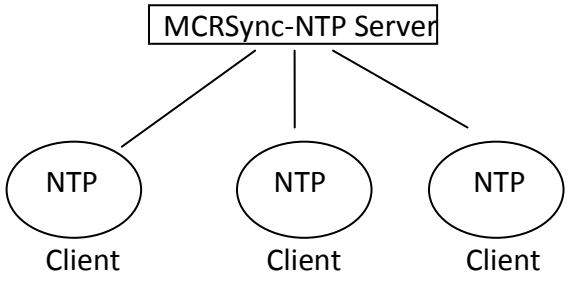


Figure 1. A representation of a small network using NTP

The second mode of operation sets up the MCRSync-NTP server as the primary (NTP stratum 1) server. Secondary (NTP stratum 2) reference servers then synchronize to the MCRSync-NTP server. The secondary reference server then provides the NTP client with its timing information. With this approach, many platforms can be serviced in large networks as shown in Figure 2.

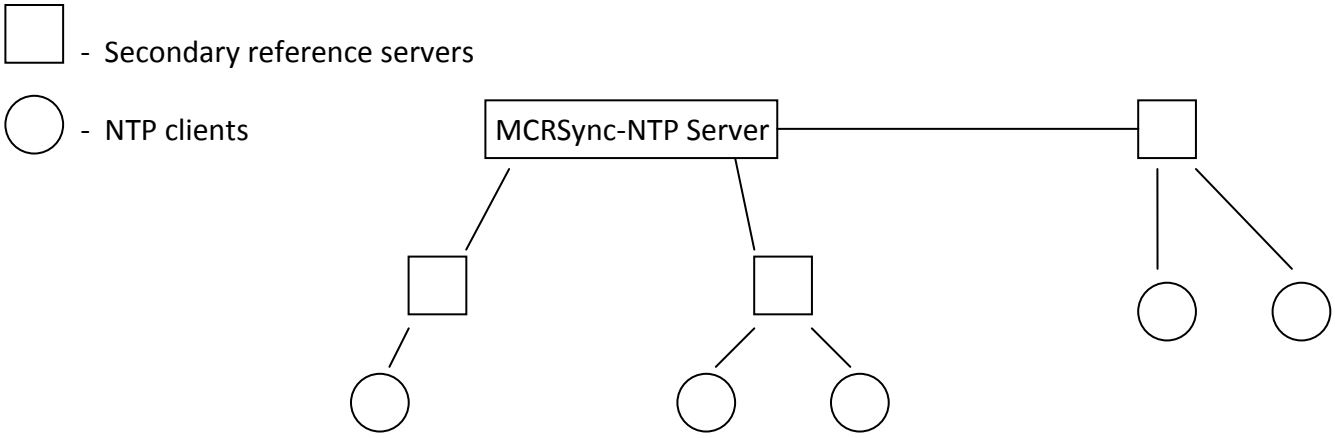


Figure 2. A representation of a larger network using NTP

As with any socket application, there's a limit to the number of clients that can be serviced in a timely manner. This limits the number of simultaneous requests the socket application can service without allowing data packets to "time-out". This doesn't mean the NTP client platforms will not synchronize to the MCRSync-NTP server if it has reached a saturation point. Most well behaved NTP clients will re-transmit their request when they recognize that their original request has timed out. At some point in this loop, the client software will be serviced and the platform will be synchronized.

There is no set rule governing when a network should utilize secondary reference NTP servers. Empirical analysis of the NTP client software to determine how many times the client software must submit a NTP request before being serviced is about the easiest method to determine if secondary servers are needed. If the MCRSync-NTP server is not servicing your NTP clients in a manner acceptable to your timing needs, you probably need secondary reference servers on your network.

Requirements

MCRSync-NTP was developed to run on the Windows platform, in either a 32 or 64 bit environment.

- Windows XP (32bit only)
- Windows Server 2003
- Windows 7
- Windows Server 2008

There are two redistributables that need to be installed. The installer application will check your system at runtime and install is need.

- Microsoft .NET Framwork 4
- Microsoft Visual C++ 2010 Redistributable Package

MCRSync-NTP needs to have a TCR1000 or PCIe card from Masterclock installed and operational with the card's MCRSync service running.

Unpacking

Supplied (Ship Kit)

The list below is for illustration purposes. Refer to your sales order for actual items shipped.

- CD-ROM
  - Installer
    - Software Applications, Configuration Utility
    - Windows Service
    - User Manual

Installation

Software
The "MCRSync-NTP" CD contains the installer, configuration utility, service and user manual.

MCRSync-NTP Configuration Utility and Services
A feature in Windows OS is the WIN32Time native computer-to-computer time synchronization mechanism. For MCRSync-NTP Monitor to operate properly W32Time must be configured in specific ways depending on the network environment.

The "MCRSync_NTP Service" is installed and started during the installation process.

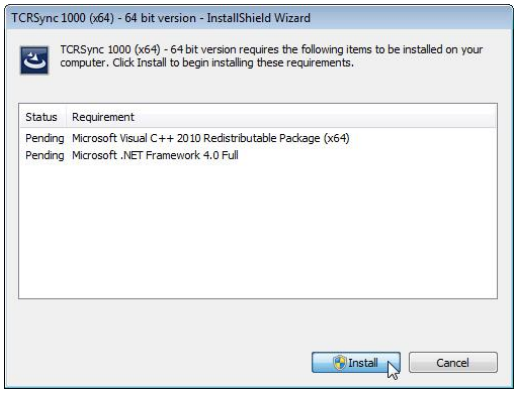
1. Insert the CD-ROM in to the drive.

2. Located and click on the file,
Setup_MCRSync-NTP-xxbit.exe
(xx is the 32 or 64 bit version)

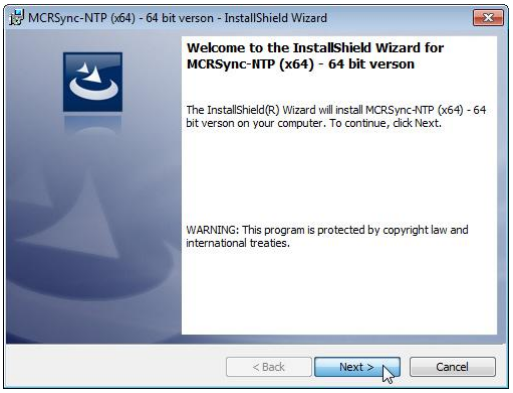
5. You might be given the option to save the file or run from the CD-ROM. Click [Run] to run the installer from the CD-ROM.

6. Depending on Windows OS security settings (UAC), there could be a number of different pop-up "Warning" windows. Click [Run] to allow the installation to begin.

7. Follow the window prompts and input field data to install the TCR1000 files to the Windows OS.


TCRSync 1000 (x64) - 64 bit version - InstallShield Wizard
TCRSync 1000 (x64) - 64 bit version requires the following items to be installed on your computer. Click Install to begin installing these requirements.
Status
Requirement
Pending
Microsoft Visual C++ 2010 Redistributable Package (x64)
Pending
Microsoft .NET Framework 4.0 Full
Install
Cancel

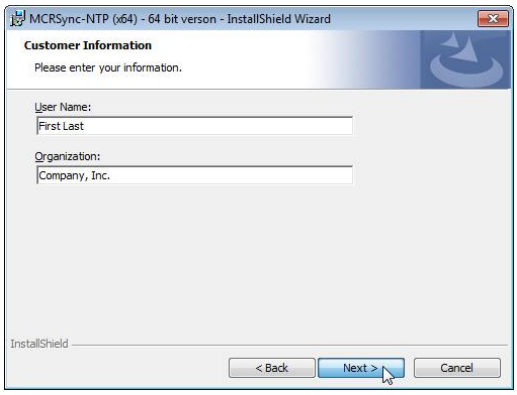
1. Required support files…


MCRSync-NTP (x64) - 64 bit verson - InstallShield Wizard
Welcome to the InstallShield Wizard for MCRSync-NTP (x64) - 64 bit verson
The InstallShield(R) Wizard will install MCRSync-NTP (x64) - 64 bit verson on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

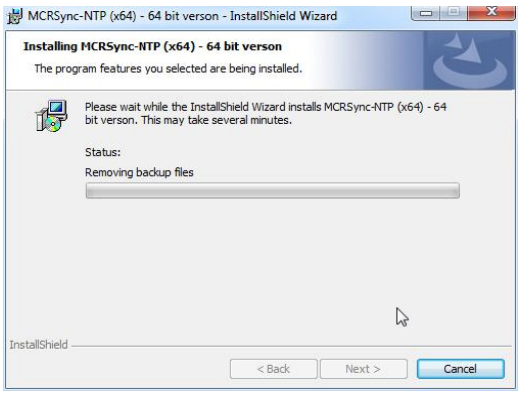
2. Welcome screen…

MCRSync-NTP (x64) - 64 bit verson - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
Software License Agreement
You should read this License carefully before using the software. This is a legal agreement between you (the customer as an individual or an entity), the end user and Masterclock, Inc. ("Masterclock") the right to use this software is granted only if you the customer agrees to the terms of this License. If you do not agree to the terms of this License, promptly return the software package and accompanying items (including written materials and binders or other containers) to the place of purchase for a full refund.
Use of this software indicates your acceptance of these terms and conditions.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Print
InstallShield
< Back
Next >
Cancel

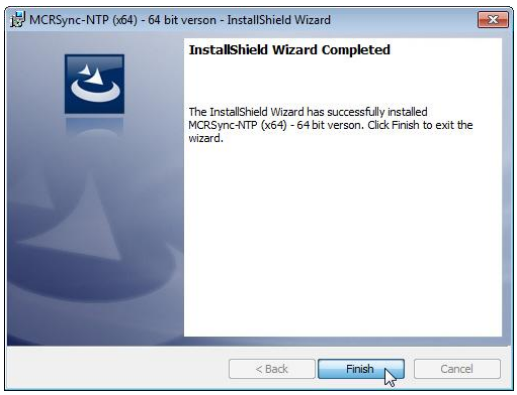
3. Accept the software license terms…



4. Enter company information


MCRSync-NTP (x64) - 64 bit verson - InstallShield Wizard
Installing MCRSync-NTP (x64) - 64 bit verson
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs MCRSync-NTP (x64) - 64 bit verson. This may take several minutes.
Status:
Removing backup files
InstallShield
< Back
Next >
Cancel

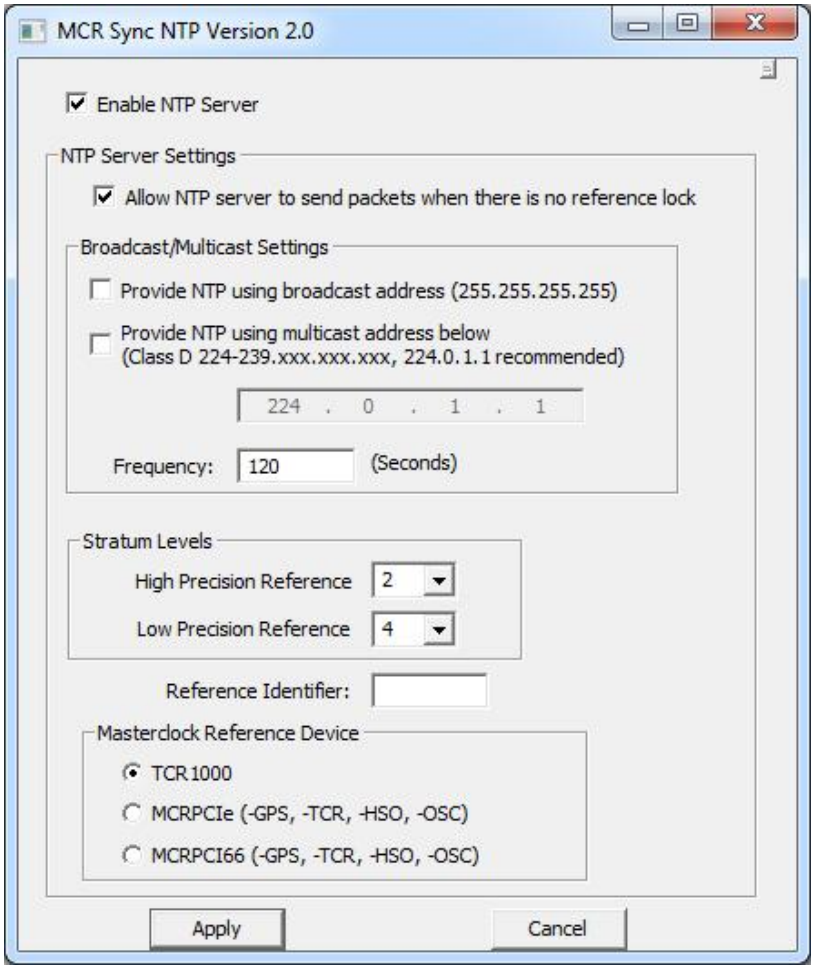
5. View the status bar…


MCRSync-NTP (x64) - 64 bit verson - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed MCRSync-NTP (x64) - 64 bit verson. Click Finish to exit the wizard.
< Back
Finish
Cancel

6. Installation complete.

Configuration Utility

The MCRSync-NTP Configuration Utility should be run to configure your time server software parameters. This configuration utility allows you for to select options regarding your source of time code and various clock synchronization operating parameters.


MCR Sync NTP Version 2.0
Enable NTP Server
NTP Server Settings
Allow NTP server to send packets when there is no reference lock
Broadcast/Multicast Settings
Provide NTP using broadcast address (255.255.255.255)
Provide NTP using multicast address below
(Class D 224-239.xxx.xxx.xxx, 224.0.1.1 recommended)
224 . 0 . 1 . 1
Frequency: 120 (Seconds)
Stratum Levels
High Precision Reference 2
Low Precision Reference 4
Reference Identifier:
Masterclock Reference Device
TCR1000
MCRPCIe (-GPS, -TCR, -HSO, -OSC)
MCRPCI66 (-GPS, -TCR, -HSO, -OSC)
Apply
Cancel

IMPORTANT: The correct device MUST be chosen for MCRSync-NTP to serve time. The choice of "Masterclock Reference Device" (see above) must match the card actually installed in the PC.

IMPORTANT: Windows Firewall MUST be modified to open UDP port 123, to allow NTP traffic.

In Windows 7:
Open Start -> Control Panel -> Windows Firewall.
Click the "Advanced Settings" link.
Click "Inbound Rules".
Click "New Rule".
Select "Port" as the type, Next.
Select "UDP and Specific Local Ports", Next.
Select "Allow the connection", Next.

Checkmark "Domain", "Private" and "Public", Next.
Enter a memorable name, like "NTP 123 UDP", Finish.

In Windows XP:
Open Start -> Control Panel -> Windows Firewall.
Click the "Exceptions" tab.
Click the "Add Port" button.
Enter a memorable name, like "NTP 123 UDP".
Enter 123 as "Port number".
Select "UDP".
Click the "OK" button.

Also, the firewalls in any anti-virus or other utility that is running on the PC may need UDP port 123 opened.

IMPORTANT: The service named Windows Time must be disabled so it will not tie up port 123:

Right-click "My Computer" and choose "Manage".
Expand "Services and Applications" and select Services.
In the list find "Windows Time".
Right-click it and choose "Properties".
In the pane that appears open the drop-down box labeled "Startup type" and choose "Disabled".
Click the "OK" button.

(Note the real name of that service is W32Time.)

Operation

The MCRSync-NTP server is designed to have minimum intrusions on the day to day operation of the computer it is installed on. With that philosophy, the MCRSync-NTP server will automatically obtain the IP address of the machine installed on, check for required services, initialize and bind the NTP port and configure itself as a service. When these requirements have been met, the MCRSync-NTP server will start.

When running, the MCRSync-NTP server will make an application event log entry noting its startup time. It will make a second entry to the application log no longer than one minute after it has started noting that it has synchronized to its time source. These are the only two notations that the MCRSync-NTP server will make to the application log during normal operation.

MCRSync-NTP server is designed to monitor its internal state. Under a severe error, MCRSync-NTP server will terminate itself if it senses a condition where it will not be able to output accurate timing information. It will make an application log entry to what caused the severe error.

The MCRSync-NTP server will only send one warning message to the application log. If at some point the TCR reader card fails to interrupt, the MCRSync-NTP server will issue a warning message that it has not received an interrupt from the TCR reader card for 90 seconds. Usually the cause of this message is the loss of the SMPTE time source into the TCR reader card. It will log a warning message when communication with the TCR reader card is lost and when communication with the TCR reader card was re-established. The MCRSync-NTP server will continue to operated but will flag the NTP packets outputted as invalid until the time it has reestablished communication with the TCR reader card.

Uninstall MCRSync-NTP

Use the steps below to uninstall MCRSync-NTP from your Windows PC.

Service

1. Remove the MCRSync_NTP Service.
    a. For x86 (32 bit) systems, double-click the file, “mcrsync-ntp_x86_uninstall_sc.exe”
    b. For x64 (64 bit) systems, double-click the file, “mcrsync-ntp_x64_uninstall_sc.exe”

Application

2. Uninstall the files and folders from your system.
    a. From the Start Menu, navigate to the Masterclock\MCRSync-NTP folder.
    b. Click, “Uninstall MCRSync-NTP”.

Limited Warranty

This Masterclock, Inc. product warranty extends to the original purchaser.

Masterclock warrants this product against defects in materials and workmanship for a period of one year from date of sale. If Masterclock receives notice of such defects during the warranty period, Masterclock will, at its option, either repair or replace products that prove to be defective.

Should Masterclock be unable to repair or replace the product within a reasonable amount of time, the customer's alternate remedy shall be a refund of the purchase price upon return of the product to Masterclock. This warranty gives the customer specific legal rights. Other rights, which vary from state to state or province to province, may be available.

Exclusions
The above warranty shall not apply to defects resulting from improper or inadequate installation or maintenance by the customer, customer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product or improper site preparation and maintenance (if applicable).

Limitations
Masterclock makes no other warranty, either expressed or implied, with respect to this product. Masterclock specifically disclaims the implied warranties of merchantability of fitness for a particular purpose.

In any state or province which does not allow the foregoing disclaimer, any implied warranty of merchantability or fitness for a particular purpose imposed by law in those states or provinces is limited to the one-year duration of the written warranty.

Exclusive Remedies
The remedies provided herein are the customer’s sole and exclusive remedies. In no event shall Masterclock be liable for any direct, indirect, special, incidental or consequential damages, whether based on contract, tort or any other legal theory.

In any state or province that does not allow the foregoing exclusion or limitation of incidental or consequential damages, the customer may have other remedies.

Service Information

We sincerely hope that you never experience a problem with any Masterclock product. If you do need service, contact Masterclock's Technical Support team. A trained specialist will help you to quickly determine the source of the problem. Many problems are easily resolved with a single phone call or email. If it is necessary to return a unit to us, an RMA (Return Material Authorization) number will be given to you.

Visit our website to download a current RMA request form.
http://www.masterclock.com/rma.php

Masterclock tracks the flow of returned material with our RMA system to ensure speedy service. You must include this RMA number on the outside of the box so that your return can be processed immediately.

RMA Policy

Our RMA policy is straight forward and is based on several basic premises

- An item can be returned, subject to several basic requirements, under our 30 day Satisfaction Guarantee.
- If an item fails within the Warranty Period we will repair and return it freight prepaid.
- If an item is outside the warranty period and requires repair we will inspect, repair and return the item to you for a reasonable charge for the work and the cost for freight.
- If you think an item or system is not working properly we expect you to read the instruction manual, talk with our technical support department and make a reasonable effort to resolve the issue.
- If you return an item to us for repair and the item is found to work properly then we will charge you an "Analysis and Inspection" charge plus the return freight.

Please supply us with as many details about the problem as you can. The information you supply will be supplied to the repair department before your unit arrives. This helps us to provide you with the best service, in the fastest manner.

We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call. We appreciate your ideas and will respond to them.

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